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ABSTRACT

This annotated bibliography was compiled to provide teachers with sources of information concerning the metric system. Articles of general interest concerning the reasons for change and experiences of others in implementing the change are included, as well as materials for practical use by teachers. Books and articles from current journals are described in some detail; bibliographic information is provided and, where appropriate, price and ordering information is included. Among the articles of general interest several government documents dealing with metric units in industry are listed. Books and articles listed for practical use range from detailed expositions of the system itself to guidelines on the teaching of the metric system at various grade levels. Seven films, twenty-one filmstrips, and two videotape films series, appropriate for classroom use, are described; prices and ordering information are provided. (SD)

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METRIC CONVERSION: AN ANNOTATED BIBLIOGRAPHY FOR TEACHERS

The United States government has noted that a changeover to the metric system in this country is inevitable and, as a first step, this year became formally committed to that end with passage of H.R. 69 -- Education Amendments of 1974. In this bill the Congress authorized federal spending over the next four years to back up new policy of encouraging education agencies and institutions to prepare students to use the metric system of measurement. Meanwhile, state governments have been taking action to educate the public and many schools and school systems are embarking on or expanding metric instruction. Teachers may find the following selected references of general interest and practical value as they strive to keep informed and to increase their own and their students' knowledge of the metric system. For a concise picture of metric conversion and how the profession has responded, see the NEA Briefing Memo No. 7, "Metric Conversion and the Teacher."

General

Arithmetic Teacher. "Metrication." (Marilyn N. Suydam, editorial chairperson.) Arithmetic Teacher 20: 243-322; April 1973. Most of the articles in this special issue provide background information on the metric system -- what it is, how it was developed, what advantages there are in using it. Some specific suggestions for teaching are also included.

Bormet, David. "Metrication in Education...A Review." American Metric Journal 2: 5-6, 9; May/June 1974. To find out what American educators are doing to prepare for comprehensive instruction of the metric system, Bormet examined periodical and journal literature published in 1971, -72, and -73 written by and for educators. His analysis of 131 indexed articles showed that only 43 were specifically about education or addressed directly to teachers and administrators. The number of articles providing the individual teacher

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with ideas or sample metric units is increasing and they seem to agree that active measuring on the part of students is vital to establishing the concept of the metric system. A few articles emphasized pre- and in-service teacher training.

Chalupsky, Albert B.; Crawford, Jack J.; and Carr, Edwin M. Going Metric: An Analysis of Experiences in Five Nations and Their Implications for U. S. Educational Planning. Final Report, National Institute of Education Project No. 3-2173. Palo Alto, Calif.: American Institutes for Research in the Behavioral Sciences, 1974. 128 pp. The major objectives of this study were to review metric conversion in other countries in order to identify attendant educational problems, to examine the educational changes made to facilitate conversion, to relate such conversion steps to problems and progress, and to make recommendations on how the U. S. can best utilize the experiences of the other countries. Specific problems in metric education are identified and coping strategies are described. These include problems of resistance to change, inadequate materials, equipment conversion, teacher training, vocational training, communication and coordination, and policy and scheduling difficulties. Nine major recommendations for the U. S. are made.

DeSimone, Daniel V., director. A Metric America: A Decision Whose Time Has Come. U. S. Metric Study Report. U. S. Department of Commerce, National Bureau of Standards, Special Publication 345. Washington, D. C.: Government Printing Office, July 1971. 170 pp. $2.25 (SD Cat. No. C13.10:345). The purpose of this study was to evaluate the impact on America of the metric trend and to consider alternatives for national policy. It is stated that the inevitable change will not come quickly or easily. Developing a national program will require much forethought and discussion, but two major, pivotal activities should be begun immediately: (1) Every school child should have the opportunity to become as conversant with the metric system as with our customary system of measurement. (2) High quality industrial practice should be vigorously promoted in international negotiations to establish engineering standards. There is need for public education to help all citizens cope with the trend.

_____. Education. U. S. Metric Study Interim Report. U. S. Department of Commerce, National Bureau of Standards, Special Publication 345-6. Washington, D. C.: Government Printing Office, 1971. 201 pp. $1.75 (SD Cat. No. C13.10:345-6). The purpose of this report is to present the educational advantages and disadvantages of both the metric and customary systems of measurement; to determine current teaching of metric in schools and the trend in that direction; to define how education would have to change as the U. S. accommodates to increased worldwide use of the metric system; and to make recommendations for taking best advantage of the changes. The chief advantage for education lies in simplifying the teaching and learning of measurement. The report states major educational needs as new instructional materials, in-service teacher training, replacement and modification of instructional equipment, replacement of textbooks, and a ten-year conversion period and national guidance for publishers and school boards.

Finebloom, Carol M. Key Issues Concerning the Adoption of the Metric System and Implications for the Education of Exceptional Children. Arlington, Va.: Council for Exceptional Children, 1970. 12 pp. A survey and literature search were employed to determine current experience of exceptional children with the metric system and problems associated with the use of the English system. The needs of exceptional children in a learning experience are enumerated. Exclusive use of the metric system is recommended, a rationale for its adoption for exceptional children is presented, and recommendations for facilitating the adoption are made in terms of classroom strategy, educational personnel preparation, community responsibilities, and time considerations.

Jones, Philip G. "Metrics: Your Schools Will Be Teaching It and You'll Be Living It--Very, Very, Very Soon." American School Board Journal 160: 21-27; July 1973. The author says that the brunt of the change to metric measurement in America belongs to the education community and discusses how much it will cost a school district to convert or replace its science and math textbooks and equipment and whether metric is a better system. He encourages schools to start converting programs and equipment now, suggests a school metrication calendar, and lists seven changes that going metric is likely to bring about in school districts.

Muellen, T. K. "Metric in Maryland." Educational Leadership 31: 435-37; February 1974. Because of potential federal legislation and because of U. S. industry moves toward use of the metric system, the Maryland State Board of Education called for a plan and procedure for complete metrication of all phases of public school operation in the state by 1980. The tentative proposed schedule suggests that planning, teacher training, and curriculum research should be completed by 1974; that by 1979 the children in K-6 will be able to use the metric system as a first measurement language and students in 7-8 will use the system exclusively; and that beginning in 1980 all students in K-12 will use the metric system exclusively.

National Education Association, Instruction and Professional Development. "Metric Conversion and the Teacher." Briefing Memo No. 7. Washington, D. C.: the Association, September 1974. 4 pp. Concisely, how the profession has responded to conversion, federal views, some advantages of the metric system, and sources of information on conversion.

National Education Association and National Council of Teachers of Mathematics. Think Metric. Washington, D. C.: the Association, 1974. Package of 30, $2.25 (Stock No. 5129-7-00). This leaflet briefly presents reasons for the change to use of the metric system, explains metric units, and describes how schools will be affected and how parents can help.

Parker, Frances J. "Think Metric: It's Simple." American Vocational Journal 48: 35-37; September 1973. A Center for Metric Education has been established at Western Michigan University to develop instructional materials and conduct in-service programs for teacher educators. In this article the author is mainly concerned

with taking the fear out of metrication. She thinks the changeover will come naturally, without legislation. Arguments for and against are noted, also the logic of the metric system of measurement.

Sokol, Louis F. "Education and Training in SI Units." American Metric Journal 2: 11-13, 20, 56; January/February 1974. The author says that the most important aspect of a metrication program is metric education and suggests that the workshop approach in which the student uses metric measuring equipment is the best way to learn metric units. He says further that an important aspect of metric education is the need to teach teachers the metric system and, using the workshop approach, outlines a teacher training program.

U. S. Department of Commerce, National Bureau of Standards. U. S. Metric Study Interim Reports. Washington, D. C.: Government Printing Office. The U. S. Metric Study, requested by Congress because of the world trend to the metric system, involved public hearings and surveys of almost every activity of U. S. society. The findings are published in a summary report (see DeSimone, A Metric America) and in the following detailed special reports:

International Standards, 1970, 145 pp., $1.25 (SD Cat. No. C13.10: 345-1).
Federal Government: Civilian Agencies, 1971, 324 pp., $2.25 (SD Cat. No. C13.10:345-2).
Commercial Weights and Measures, 1971, 109 pp., $1.00 (SD Cat. No. C13.10:345-3).
The Manufacturing Industry, 1971, 165 pp., $1.25 (SD Cat. No. C13.10:345-4).
Nonmanufacturing Industry, 1971, 192 pp., $1.50 (SD Cat. No. C13.10:345-5).
Education (see DeSimone).
The Consumer, 1971, 146 pp., $1.25 (SD Cat. No. C13.10:345-7).
International Trade, 1971, 181 pp., $1.50 (SD Cat. No. C13.10: 345-8).
Department of Defense, 1971, 125 pp., $1.25 (SD Cat. No. C13.10: 345-9).
A History of the Metric Controversy in the United States, 1971, 306 pp., $2.25 (SD Cat. No. C13.10:345-10).
Engineering Standards, 1971, 257 pp., $2.00 (SD Cat. No. C13.10: 345-11).
Testimony of Nationally Representative Groups, 1971, 174 pp., $1.50 (SD Cat. No. C13.10:345-12).

Practical

Adams, H. F. R. SI Metric Units: An Introduction. Revised edition. New York: McGraw-Hill Book Co., 1974. 114 pp., paperback. This book provides valuable assistance to teachers, technicians, tradespeople, professionals, office workers -- everyone concerned with the metric system of measurement. The contents include a short history of measurement, explanations of the units making up the international system, plus problems, solutions, and conversion tables. The author has studied in depth the manner in which conversion was effected in the United Kingdom and his presentation reflects the British reports and observations to which he had access.

American Association of School Librarians and National Council of Teachers of Mathematics. One To Get Ready: A Selected Bibliography on Metrication. Chicago: the Association, 1973. This leaflet is a brief listing of sources of metrication aids, suggested films and books for review, articles in professional journals, and selected government publications and materials for parents. It also describes some advantages of the metric system.

Barbrow, Louis E. What About Metric? U. S. Department of Commerce, National Bureau of Standards, Consumers Information Series 7. Washington, D. C.: Government Printing Office, 1973. 16 pp. 80 cents (Stock No. 0303-01191). This booklet provides consumer information about the metric system in the marketplace, in everyday use, and for workers. The concise treatment, with charts and illustrations, gives the reader a fundamental understanding of the metric system as it compares with our customary measurement system.

Bright, George W., and Jones, Carol Ann. "Teaching Children To Think Metric." Today's Education 62: 16-19; April 1973. The activities described in this article constitute one way in which the metric system can be introduced to a class of fourth-graders. After most of the pupils develop adequate skills in multiplication, experience in working with area and volume can be introduced. The authors feel it is inappropriate to force children to learn the prefixes for this would promote rote rather than meaningful learning. Boys and girls seem to grasp the concepts of the metric system as long as they are not pushed too fast. Repeated practice extending over a long period of time appears to be the best way to develop skills and confidence in using metric units.

Drake, Paul. "Hello Metrics." Teacher 92: 46-50; October 1974. The author tries to answer ten question often asked about teaching metric: How do I begin? How should I "kick off" my instruction? Is there a logical order to metrication instruction? Do we mention the "old" system? Should primary-graders begin learning metrication? How can intermediates and older students begin learning metrication if they have already been taught the English system? Should metrication be taught in science or math classes? What is the educator's role in national conversion? Where can I get information on metric measurement? How long will it take for the U. S. to transfer over entirely to the metric system?

Gilbert, Thomas F., and Gilbert, Marilyn B. Thinking Metric. New York: John Wiley & Sons, 1973. 142 pp. In this programmed self-teaching guide, a special chart enables the learner to make selections which apply to his/her own needs and to bypass the rest. Practice problems and tests serve to indicate progress and where to find extra help. The first part of Chapter 8 is very important in that it will help the reader to maintain mastery in thinking metric. The rules of thumb for conversion from the customary to the metric system are tools for practicing new metric skills on a day-to-day basis.

Glaser, Anton. Neater by the Meter: An American Guide to the Metric System. Southampton, Pa.: the Author (1237 Whitney Rd., 19866), 1974. 112 pp. This publication is written for the nontechnical person and oriented to everyday needs. The relative size of metric

units of measure is illustrated through common and familiar objects. This informal approach provides an introduction to units of distance measure, volume, weight, and temperature in the metric system. Part II relates some of the history of the metric system and suggests teaching practices for those who want to help others learn it.

Henry, Boyd. Teaching the Metric System. Chicago: Weber Costello, 1974. 48 pp. $1.50. This guide to the "direct all-metric international way" of teaching metric answers teachers' questions on what the metric system is, why the U. S. is adopting it, and how to teach it. Included are easily duplicated charts, puzzles, and games for introducing and reinforcing metric units of length, area, volume, weight, and temperature.

Higgins, Jon L., editor. A Metric Handbook for Teachers. Reston, Va.: National Council of Teachers of Mathematics, October 1974. 137 pp. This handbook is for teachers at all levels who are implementing the metric system in their classrooms. The book is divided into five sections that make it easy to find specific information. The sections and subsections are as follows:

1. "Introducing the Metric System" -- Activities for Introducing Metric Concepts to Teachers; Inching Our Way Toward the Metric System; The Metric System: Past, Present, and Future; Historic Steps Toward Metrication.
2. "Teaching the Metric System: Activities" -- Experiences for Metric Missionaries; Metric Equipment: How To Improvise; Think Metric--Live Metric.
3. "Teaching the Metric System: Guidelines" -- Schools Are Going Metric; Metric: Not If, But How; Teaching the Metric System as Part of Compulsory Conversion in the United States; Metric Curriculum: Scope, Sequence, and Guidelines.
4. "Looking at the Measurement Process" -- Ten Basic Steps for Successful Metric Measurement; Thinking About Measurement and Teaching About "About."
5. "Metrication, Measure, and Mathematics" -- considers measurement as a mathematical function and explores several measure functions.

Instructor. "The Metric System: Learn It! Think It! Teach It!" Instructor 83: 59-66; October 1973. In the introduction to this feature, Jeffrey V. Odom points up some educational advantages of metrication, impacts of the change, and ideas on how to teach metric. In "Metrics, Students, and You!" author George W. Bright discusses the metric units that will be used most frequently in the elementary school. Some of the mathematical relationships among these units are highlighted to illustrate the simplicity of the metric system. Then attention is given to teaching the units, with special emphasis on the potential problems in helping children adapt to bilingualism in measurement languages. Bright also stresses the ability to think metric, giving careful consideration to the special role of instruction in this process. The feature concludes with a "Table of Metric Units."

Metric Conversion Kit. Barrington, N. J.: Edmund Scientific Co., 1973. $5 (Stock No. 71,844). This kit is equally useful to teachers and students, acquainting the user with the basics and enabling him/her to instantly convert from customary to metric measurements. Included are a pocket conversion calculator; three plastic lenticular rules for avoirdupois, fraction/decimal, Fahrenheit/centigrade; a two-meter (6' 7") retractable tape measure; fifty 100-centimeter self-stick rules that can be placed on lab equipment, desks, and books; a pocket conversion card; and a 54-page paperback entitled The U.S.A. Goes Metric.

Metric Manual. Neenah, Wis.: J. J. Keller & Associates, 1974. $25. This publication, which contains useful information in a loose-leaf format about conversion to the metric system of measurement, is for business, school, home, and library use. Coverage includes (a) the history of measurement, development of metrication, and advancements within the U.S.; (b) U. S. metric considerations pro and con regarding various segments of the economy--industry, commerce, education, professions, and government; (c) standards and measurement comparisons. There is also a comprehensive glossary, an appendix of useful information, plus metric illustrations and charts, references, and ruled pages for notes, contacts, and telephone numbers.

Metric System Guide Library. Neenah, Wis.: J. J. Keller & Associates, 1974. Five volumes. This library set has been developed as a solid reference source for any academic inquiry. The volume formats are:

I. Metrication in the United States--Orientation and Structure
II. Legislation and Regulatory Controls--Federal and All States
III. Metric Units--Comparisons, Factors, Tables
IV. Reference Sources
V. Metric Definitions

Volumes I, II, and III are available now. Volumes IV and V will be on the market in 1975.

Metric Text. New York: Central Instrument Co., December 1973. 40 pp. A fully illustrated, soft-cover text dealing with metric history, understanding and using the metric system in everyday life, metric in drafting, conversion factors, conversion tables, and a guide to available aids.

"Metrication for the United States: A Guide to Available Metric Aids." New York: Central Instrument Co., n.d. 2 pp.

Moss, Jeanette K. "Teaching Aids: Tooling Up for the Metric Changeover." Teacher 91: 90-97; March 1974. The author lists some recently produced materials that may help teachers and students make the change smoothly from the English system of measurement to the metric system. With the wide price range--from $1.98 converters to a $450 multimedia program--there is undoubtedly something here to fill most needs and suit most budgets.

National Council of Teachers of Mathematics, Metric Implementation Committee. "Metric: Not If, But How." Arithmetic Teacher 21: 366-69; May 1974. Some general guidelines for teaching measurement and specific guidelines for teaching the metric system.

National Science Teachers Association. Metric Exercises: Lively Activities on Length, Weight, Volume, and Temperature. Washington, D. C.: the Association, 1973. 35 pp. This booklet of exercises and activities for learning the fundamentals of the metric system is designed for elementary through senior high school students. It is organized under four topics (length, weight, volume, and putting it all together activities) and comes packaged with an ungraded thermometer, metric ruler, and one-gram centimeter cube. The activities and exercises can be simplified or extended to meet the needs of the class or individual students.

Nation's Schools. "Students Learn To Live with Liters and Meters." Nation's Schools 93: 24-25; April 1974. How particular teachers--one in Davis, California, and one in Warwick, Rhode Island--and the Worcester, Massachusetts, Public Schools developed and implemented a metric program for elementary grades.

Sellers, Robert C., editor. Basic Training Guide to the New Metrics and SI Units. Floral Park, N. Y.: Robert C. Sellers & Associates, 1972. 60 pp. The aim here is to help the reader to start thinking about the "new" metric-SI system. Contents include the new metric-SI system, SI basic and derived units, units for engineers and scientists, metric micrometer, conversion factors, non-SI units, notation for use in written and printed documents, conversion tables, and multiple factor conversion charts.

Stover, Allan C. You and the Metric System. New York: Dodd, Mead & Co., 1974. 95 pp. The book explains what metric units are, how they are used, how changeover will affect the public, and the problems involved. In regard to education, the author says that the metric system is easier for students to learn and teachers to teach. Since schools will prepare American youth to use the new units, the success of metric changeover rests with them: "A good educational program will assure a smooth transition, a poor program, a chaotic transition."

Trueblood, Cecil R. Metric Measurement Activities and Bulletin Boards. Dansville, N. Y.: Instructor Publications, 1973. 48 pp. According to the author, the first order of teaching metric measurement should be thorough understanding of measurement and how students perceive measurement at various levels of development. Therefore, this book emphasizes the concepts of measurement using metric units as the vehicle. The booklet includes general guidelines for teaching measurement; an explanation of metric; and learning activities for linear, area, weight, and volume measurement which are geared to three stages of child development based on Piaget.

Trueblood, Cecil R., and Szabo, Michael. "Procedures for Designing Your Own Metric Games for Pupil Involvement." Arithmetic Teacher 21: 404-408; May 1974. This article presents and illustrates a set of seven criteria developed in an in-service workshop. The elementary teacher participants wanted to be able to produce metric games and activities that would fit into their metrication program. The procedure described can be used for other science and math projects, and suggestions are listed.

Turner, Rufus P. Metrics for the Millions. Indianapolis: Howard W. Sams & Co., 1974. 96 pp. This book compares the metric system with the U. S. system in understandable terms. An introduction to the metric system and description of the U. S. movement toward its adoption are followed by chapters on the basic metric units of length, area, volume, mass and weight, and temperature. Illustrative examples show how to convert from metric to U. S. units and vice versa. At the end of each chapter is a set of practice exercises which enable the reader to test his/her skill. An alphabetical collection of hundreds of conversion factors is included.

U. S. Department of Commerce, National Bureau of Standards. Toward a Metric America: A Brief Bibliography and Other References. NBS List of Publications 67. Washington, D. C.: the Bureau, November 1973. 12 pp. This bibliography lists publications of the Bureau of Standards and the American National Standards Institute, organizations that market metric materials for educators, and additional sources of information. Appended is an NBS chart--"All You Need To Know About Metric." A similar list is available as NBS Special Publication 389, Some References on Metric Information (includes another NBS chart--"Metric Conversion Factors"), for sale by the Government Printing Office (SD Cat. No. C13.10:389, 25 cents).

Worcester Public Schools. How To Teach Metric Now. Worcester, Mass.: Board of Education, 74 pp. $3. The bulk of this guide covers K-6 objectives and activities. Objectives for junior and senior high schools cover such subject areas as cooking, clothing, woodworking, mechanical drawing, power mechanics, electronics, and home mechanics. Science and math are not included because they went metric years ago.

Audiovisual

Films

A Metric America. 14 min., 16mm, color, sound. AIMS Instructional Media Services, P. O. Box 1010, Hollywood, Calif. 90028, 1974. $215; rental, $20 (Code No. 9345). This animated film shows why America is going metric, the fundamental concepts of the system, and some of the conversion problems. Stressing the decimal characteristics of the metric system, it focuses on basic units of measure and important prefixes. The film presents a manageable amount of information and offers, also, understanding and motivation. Grade level: junior high-adult. (See also filmstrip series of same title, listed below.)

Gullible's Travails, or How the Meter Met Her Match. 12 min., 16mm, sound, color. Davidson Films, 3701 Buchanan St., San Francisco, Calif. 94123. $140; rental, $12.

Meter, Liter, and Gram. 13 min., 16mm, color, sound. BEA Educational Media, 2211 Michigan Ave., Santa Monica, Calif. 90404. Metric measurement units of length, volume, and weight are related. All are based on the meter metric system. The prefixes--centi-, deca-, milli-, and kilo- are also illustrated. Grade level: elementary-junior high.

Metric Measurement--Length and Area. 12 min., 16mm, color, sound. Moreland-Latchford Productions, 299 Queen St., W., Toronto, Ont. M5V 256, 1974. Presentation of the meter, the base unit of length, and an introduction to the most commonly used units which are multiples or submultiples of the meter. Practical demonstrations present the concept of area in the classroom and home. Grade level: intermediate. $140.

Metric Measurement--Mass. 9 min., 16mm, color, sound. Moreland-Latchford Productions, 299 Queen St., W., Toronto, Ont. M5V 256, 1974. Practical demonstrations clearly explain the efficient multiples and submultiples of the kilogram for measuring items, from precious metals to heavy cargo. The film tells of the advantages of having SI units for world trade. Grade level: intermediate. $140.

Metric Measurement--Volume. 9 min., 16mm, color, sound. Moreland-Latchford Productions, 299 Queen St., W., Toronto, Ont. M5V 256, 1974. Visual identification is the basis for this film, which explains the relationship between cubic units and the liter. Everyday experiences are used to illustrate the concept of volume. The most commonly used units are given and everyday items are used to reinforce identification of the units. Grade level: intermediate. $140.

What Is Measurement?--Standards. 11 min., 16mm, color, sound. Moreland-Latchford Productions, 299 Queen St., W., Toronto, Ont. M5V 256, 1974. A brief and concise historical background of measurements of the Western world, from the arbitrary units to the consistent and logical International Metric System. This introductory film explains why standard measurements are essential. Grade level: intermediate. $140.

Filmstrips

A Metric America series. AIMS Instructional Media Services, P. O. Box 1010, Hollywood, Calif. 90028. Six color filmstrips with records or cassettes, covering the major concepts of the metric system. The series can be used alone or as a companion to the 16mm film of the same title. Grade level: junior high-adult. With records, $66 (Code No. F1250); with cassettes, $78 (Code No. F1251).

1. The Metric System--Historically Speaking shows how the metric system is logically the last chapter in the history of measurement, discusses the principal features of the metric system, and stresses its advantages over other systems.

2. Measuring Length Metrically discusses the meter, centimeter, millimeter, and kilometer; stresses the decimal relationship between these units; and explains new wave length definition of meter and its advantages.

3. Measuring Area Metrically describes the process of computing area in terms of unit squares. Applications in square centimeters, meters, and kilometers are provided, emphasizing the

advantages of the decimal relationships between these units as contrasted with customary units for area. Ample attention is given to the metric unit of hectare, specifically scaled for surveying land.

4. Measuring Volume Metrically describes the process of computing volume in terms of unit cubes. Metric applications begin with the cubic centimeter and mention is made of cubic meters, but the liter receives the greatest attention. The advantages of introducing this special unit are outlined. Decimal prefixes used in conjunction with the liter are explained completely.

5. Measuring Weight Metrically introduces the gram, kilogram, and milligram. Careful attention is given to the historical relationship between the gram and kilogram, including why today the latter provides the standard. Mass is contrasted with weight and the kilogram is defined precisely as a measure of mass, not weight.

6. Measuring Temperature Metrically introduces the Celsius scale as the new name for centigrade. The intervals between the freezing and boiling temperatures are compared in degrees Fahrenheit and degrees Celsius.

International System of Units (Metric Units). Four color filmstrips, each 60+ frames, 15 min., with records or cassettes and teacher's guide. Singer Society for Visual Education, Education Division, 1345 Diversey Parkway, Chicago, Ill. 60614. These filmstrips consider the magnitude of the effect of the international system of units and the impact conversion will have on our present system of weights and measures. Basic units are discussed and a plan for conversion is presented. Grade level: junior high. With records, $50 (Cat. No. CL550-SBR); with cassettes, $54 (Cat. No. CL550-SBTC).

1. Introduction to the International System of Units
2. Metric Units: Time and Temperature
3. Metric Units: Mass and Its Derivatives
4. Metric Units: Electric Current, Luminous Intensity, Amount of Substance, and the Plane and Solid Angle

Metric or English? That Is the Question. Four color filmstrips, with records or cassettes and teacher's guide. Singer Society for Visual Education, Education Division, 1345 Diversey Parkway, Chicago, Ill. 60614. This series traces the history of both English and metric measurement systems and points out advantages and disadvantages of both. Students will learn about how metric works, problems of conversion, and the ultimate economic advantage of increased foreign trade after conversion. Grade level: upper intermediate-junior high. With records, $36.50 (Cat. No. CL550-SAR); with cassettes, $40.50 (Cat. No. CL550-SATC).

Metric System for the Intermediate Grades. Two sets of color filmstrips. Pathescope Educational Films, 71 Weyman Ave., New Rochelle, N. Y. 10802. These filmstrips depict children using the system to measure things around them and then solving problems arising from their own experiences.

Set 1. The Metric System for the Intermediate Grades--Length, Area, Volume. Four filmstrips (Units of Length Shorter than a Meter, Units of Length Longer than a Meter, Metric Units of Area, Metric Units of Volume), with records (No. 306, $52) or cassettes (No. 306C, $60) and teacher's manual.

Set 2. The Metric System for the Intermediate Grades--Capacity, Mass, Metric Relationships. Three filmstrips (Metric Units of Capacity; Metric Units of Mass; Relating Length, Capacity and Mass), with records (No. 307, $39) or cassettes (No. 307C, $45) and teacher's manual.

Metric System Minimodule. Singer Society for Visual Education, Education Division, 1345 Diversey Parkway, Chicago, Ill. 60614. Scheduled for release in 1974. Six color filmstrips form the core of this innovative multimedia learning module. The hero of these animated strips--named Box--works in the math laboratory to discover the meaning of and relationships among metric units of length, weight, and capacity. The minimodule also includes an array of coordinated reinforcement practice games and activities. Grade level: primary.

The Metric System: The Universal Language of Measurement. Six color filmstrips with records and a comprehensive teacher's manual. Pathoscope Educational Films, 71 Weyman Ave., New Rochelle, N.Y. 10802. $75 (Cat. No. 516).

Understanding the Metric System. Four color filmstrips, average 50 frames, 10 min., with records or cassettes. Singer Society for Visual Education, Education Division, 1345 Diversey Parkway, Chicago, Ill. 60614. This presentation of the fundamentals of the metric system has an easy-to-understand vocabulary and in cartoon style features two central characters with whom students can readily associate. With records, $36.50 (Cat. No. CL550-SCR); with cassettes, $40.50 (Cat. No. CL550-SCTC). Level: primary-intermediate.

1. What Is Measurement?
2. Measuring Distance
3. Measuring Weight and Mass
4. Measuring Volume

Videotapes

Measure to Measure. Five 15-min. lessons and one in-service lesson, 3/4-inch video cassette, color, with teacher's guide. Great Plains National Instructional TV Library, Box 80669, Lincoln, Neb. 68501. Grade level: junior-senior high.

1. Three Barleycorns Equal an Inch examines the need for measurement and traces the development of some of the customary units.

2. The Birth of a System traces metric from its inception during the French Revolution through today.

3. "Kilo" Sounds Greek to Me introduces metric prefixes and their values and explains the formation of measurement words whose meanings are apparent.

4. Metric: Less Hectic explains interrelationships among units and the ease of moving from one unit to a larger or smaller unit.

5. Measuring Up to Tomorrow is an entertaining look at daily routine in the near future under the metric system.

The in-service lesson will aid the teacher in planning use of this series. It features series excerpts and suggested activities.

The Metric System. Fifteen 20-min. lessons, 3/4-inch video cassette, color, with teacher's guide. Great Plains National Instructional TV Library, Box 80669, Lincoln, Neb. 68501. Grade level: intermediate.

The first five lessons are designed to motivate viewers to want to know more about the metric system and terms and to relate in a common-use way to more familiar metric units of measure.

1. Introducing the Metric System presents the meaning of measurement and introduces the metric units--meter, liter, and gram.

2. What Is the Metric System? explains meters, liters, and grams, how they are used, and why they are needed. Emphasis is also given to decimal systems and precision measurement.

3. Metric Units of Length emphasizes all the common units and briefly introduces the decameter and hectometer.

4. Metric Units of Weight presents the gram as a basic or "naming" unit and the kilogram as the standard and most commonly used unit. Some facts about Celsius temperature are also included.

5. Metric Units of Volume presents the liter as the basic unit--of liquid volume in particular.

An additional five lessons are scheduled for fall 1974 use and the balance for spring 1975.